

REMARKS

The amendments made herein are generally editorial in nature or are made to address the rejection under 35 U.S.C. 112. Additionally, claims 12-23 are non-elected and therefore have been canceled. The amendments have been made in order to respond to points raised for the first time in the Office Action of June 2, 1993. The amendments do not require further search or consideration and do not raise any questions of new matter. Moreover, they are considered to place the application in better condition for allowance. Entry of the amendments is respectfully requested.

Turning now to the Office Action, claims 1-11 have been rejected under 35 U.S.C. §112, second paragraph, as indefinite.

In claim 1, applicants point out that both the monomolecular and polymer film as claimed are made of the same material. A monomolecular film is formed by washing a substrate with a nonaqueous solution after the dehydrochlorination reaction between a substrate surface and the material. By not including this step of washing the substrate with a nonaqueous solution, a polymer film is formed rather than a monomolecular film. As a result, the molecular weights of the molecules for the monomolecular film and polymer film are different. In order to further explain this difference, applicants attach a publication, Ogawa et al, "Studies of Molecular Alignments of Monolayers Deposited by a Chemical Adsorption Technique." As shown in Fig.

2 on page 1475 of the article, MER IR spectra of the monomolecular film deposited by the CA technique (A) and the monomolecular film built up by the LB technique (B) are significantly different from those of a polymer film of V-NTS coated by a spinner (C). In this case, the polymer film is not oriented whereas the monomolecular films are oriented.

In claim 1, at least one CF_3 group and one siloxane group are contained in the film. A fluorocarbon group is required for imparting a water-repelling property to a monomolecular or polymer film. A siloxane group is required for adhering the film to the substrate surface.

In claim 2, the word "or" has been added to improve clarity.

In claim 3, the word "said" has been added.

Claim 4 has been rewritten to overcome the Examiner's assertion of lack of antecedent basis. Further, the phrase pointed out by the Examiner has been deleted.

The chemically adsorbed film of claim 6 can be a multimolecular or monomolecular layer of siloxane. The multimolecular layer further modifies the monomolecular film recited in claim 1 because a multimolecular layer is a specific type of monomolecular film which is formed by building up monomolecular films. Claim 6 is further explained by Fig. 43 of this application, which figure represents the embodiment of claim 6.

In claim 7, the substrate surface is provided with irregularities by a coated layer incorporating silicate glass particles. This is an embodiment of claim 1 where the outer surface of the water and oil repelling film has irregularities. The monomolecular film of claim 1 is selected and is formed on top of a coated layer. Further, the reference to molecules has been deleted. The claim has been amended so that both a CF_3 group and a siloxane group are required as in claim 1.

With respect to claim 9, applicants submit that height is measured by means that are very well known in this field. In particular, the height represents the difference between the highest point and lowest point of the film. This is known in the field as R_{max} .

In view of the above, applicants submit that the claims are definite, and thus satisfy the requirements under 35 USC 112. Accordingly, withdrawal of this rejection is respectfully requested.

The Examiner requested that a new Declaration be filed because the original Declaration was torn at the signature line. A new Declaration was filed on August 10, 1993, and thus applicants have responded to the Examiner's request for a new Declaration.

The Examiner requested that applicants cancel the non-elected claims. Applicants have canceled these claims so as to facilitate allowance.

Claims 1-10 have been rejected under 35 U.S.C. §103 on Kido in view of Ogawa '316 and Inoguchi.

By way of a brief review, this invention is a water and oil repelling film comprising a chemically adsorbed film formed on the surface of a substrate. The water and oil repelling film has an outer surface having irregularities exceeding 10 nanometers. Further, the chemically adsorbed film is bonded by covalent bonds to the substrate surface, and the chemically adsorbed film is a monomolecular or polymer film comprising a CF_3 group and a siloxane group. In particular, the CF_3 group is at the outer surface of the chemically adsorbed film.

Kido does not disclose the claimed film. Kido describes a resin laminate of one layer of a polyimide resin film, wherein undulations of 0.03-5 μm (between 30 and 5,000 nanometers) are seen. The claimed invention, on the other hand, requires surface irregularities of a size that is much smaller than those disclosed in the Kido reference.

Moreover, the Kido reference teaches away from the size of the irregularities in this invention. Kido clearly discloses at column 2, line 47, that "if the undulations are less than 30 nanometers, no sufficient improvement in slidability can be hoped for." Further, Kido clearly states that adding particles of less than 1 μm (1,000 nanometers) has little influence on the film's physical properties. In contrast, the surface irregularities of the film of this invention are much less than 1,000 nanometers.

As explained, for example, at page 3 of this specification, it is difficult to obtain a surface having excellent luster using surface irregularities of the size disclosed in Kido. In addition, such a coating has inferior adhesion to the substrate, and high durability cannot be obtained. This invention solves the above problems by providing a coating film which has strong adhesion to the substrate, is free from pin holes, has desirable surface irregularities, is excellent water and oil repelling and has durability. Kido clearly does not disclose the size of the surface irregularities of this invention and does not disclose the advantages of the reduced size of the surface irregularities.

Further, the Kido reference does not disclose a CF_3 group and a siloxane group, wherein the CF_3 is at the outer surface of the chemically adsorbed film.

Thus, Kido does not teach this invention. Moreover, as will be described below, the secondary references do not overcome these deficiencies. Therefore, even the combination of cited references does not teach this invention.

Ogawa '316 discloses a recording medium which comprises a recording layer formed on a base body and a protection layer formed on the recording layer. Ogawa '316 does not disclose a water and oil repelling adsorbing film formed on a substrate surface where the film is a chemically adsorbed film having an outer surface with irregularities exceeding ten nanometers.

Ogawa '316 also does not disclose the presence of a CF_3 group and a siloxane group, wherein the CF_3 group is at the outer surface of the chemically adsorbed film.

Thus, Ogawa does not teach the surface irregularities of the size recited in the claims of this application, nor does he teach the presence of a CF_3 group at the outer surface of a chemically adsorbed film as required by the claimed invention.

Inoguchi discloses a glass fiber product for use in the reinforcement of fluororesin. Further, the reference describes thermoplastic materials and inorganic fillers. The Inoguchi reference does not teach a water and oil repelling adsorbing film formed on a substrate surface, where the film is a chemically adsorbed film with an outer surface having irregularities exceeding 10 nanometers. The reference also does not disclose the presence of a $-\text{CF}_3$ group and a siloxane group, wherein the $-\text{CF}_3$ group is at the outer surface of the chemically adsorbed film.

Thus, neither Kido nor the secondary references discloses the invention as claimed. Therefore, even if the references were combineable, the combination still does not teach the claimed invention.

Notwithstanding, in order to demonstrate that the claimed combination of elements would not have been obvious, applicants are submitting a Declaration Under Rule 132. The Declaration demonstrates the unexpected improvement using the

film having the specific combination of elements recited by the claims.

In view of the above, applicants request withdrawal of this rejection.

Claim 11 has been rejected under 35 U.S.C. §103 based in Kido in view of Ogawa '316 and Inoguchi in further view of Ohno.

As explained above and as demonstrated in the attached Declaration, the combination of Kido, Ogawa and Inoguchi does not render the claims obvious.

The Ohno reference discloses a magnetic recording medium having a magnetic film formed on a substrate directly or through an underlayer from an alloy containing cobalt as a principal component. Ohno describes a magnetic film for use in, for example, a magnetic disk system. The magnetic film of Ohno is unrelated to this invention. This invention is a water and oil repelling film formed on a substrate surface, not a magnetic recording film, and cobalt is not part of the composition of the invention. The fact that the Ohno reference describes surface roughness as provided on a magnetic film recording medium does not teach or suggest the invention claimed in this application, even when combined with the other references.

Ohno does not disclose films of the type claimed, in which the film is bonded by covalent bonds to the substrate surface, where the chemically adsorbed film is a monomolecular or

polymer film comprising a $-CF_3$ group and a siloxane group, wherein the $-CF_3$ group is at the outer surface of the chemically adsorbed film.

In view of the above, applicants request withdrawal of the rejection.

In summary, applicants submit that the rejections have been overcome. Early issuance of a Notice of Allowance is respectfully requested.

Respectfully submitted,

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